Remote Sensing the Santa Barbara Oil Spill

SCAT (shoreline cleanup assessment technique) is a critical response activity, yet State-of-the-Art is qualitative, highly subjective, time consuming (>tidal cycle), challenged by rocks, detritus, etc., and biased towards larger tar balls.

Q: *Can spatial tar accumulation maps be derived from imaging spectroscopy data?*
Q: *Can the natural and spilled tar spatial distributions (20 km separation) be separated?*
Q: *How does the remote sensing-derived map compare with SCAT?*
Q: *Can time history be derived from spatial distribution of beach tar from AVIRIS NG data? If yes, is the temporal history similar along the coast?*
Q: *Can tar (and oil) be derived from WorldView III satellite multispectral data?*

Experiment: Collect AVIRIS NG data of north S. Barbara Channel from Coal Oil Point (COP) - natural seep tar, to Refugio Beach - oil slicks and spill tar, to Gaviota Beach - spill tar), surface sand and scene endmember spectral data, validation beach tar accumulation map, and concurrent multispectral satellite imagery - WorldView III (WV3), 1.2 m).

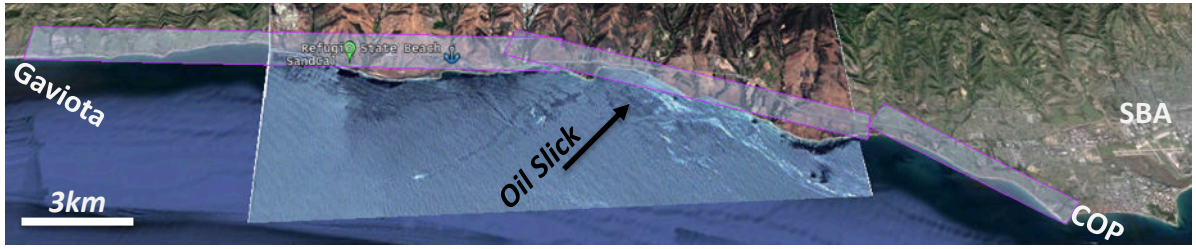

Fig 2. *AVIRIS NG flight plan*, flown 24 May at 150 m, 65 knots, ~20 cm pixel. Also, concurrent WVIII imagery and locations of the oil spill's focus and surface validation site.

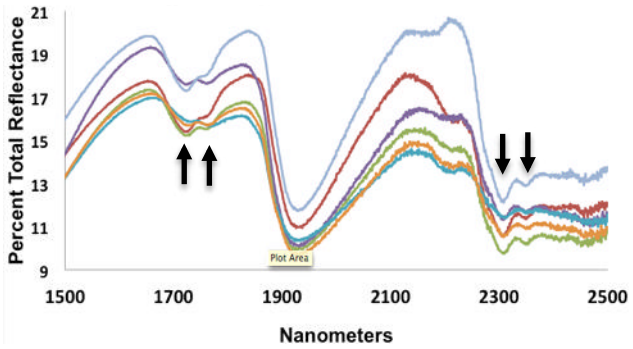

Fig 1. Lab spectra of six Refugio Beach tarballs (collected 22 May) measured on a Cary500 Spectrometer. Note the prominent petroleum hydrocarbon absorption features–*1st ever reported*.

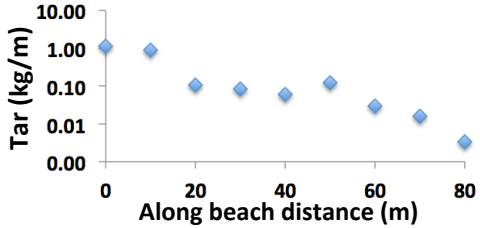

Fig 3. Along-beach tar shows effects of beach steepness and protection by an upcurrent point. Data are integrated along transverse axis at each transect.

Key Findings:

- Lab and field spectra show tar petroleum hydrocarbon absorption features.
- Beach tar accumulation found size patterns consistent with high energy stranding two days earlier, and recent low energy stranding - consistent with wave/wind history).

Key Collaborations: BRI, JPL, NASA Disasters, STL (DOE contract lab), NOAA ORR, NOAA NESDIS, Cal OSPR, UCSB.

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